

About Cranial Cruciate Ligament Rupture

Incidence

Cranial cruciate ligament (CCL) rupture is the most common cause of lameness in dogs. At UW Veterinary Care, the surgeons treat over 150 patients every year for this condition. It is common for patients with CCL rupture in one knee to rupture the other knee within a year of the initial rupture event.

Causes

The cause of most CCL ruptures is not associated with a traumatic injury; this is referred to as non-contact cruciate rupture. Current knowledge indicates that CCL rupture has a genetic component. Inflammation within the knee contributes to CCL weakening. Over time, the ligament progressively frays until it has completely ruptured.

Clinical Signs

Lameness of one or both hind limbs is often the first sign of CCL rupture in dogs. This lameness can be mild to severe and may have gradual or acute onset. Patients may lean to one side while sitting (pictured below) or hold up one leg while standing.



Treatment Options

CCL rupture causes joint instability or excessive movement of the knee joint. Other structures within the knee, including the meniscal cartilages, may also become damaged as a result of this instability.

Conservative Therapy

CCL ruptures can be treated conservatively with rest, pain-relieving medications, and diet. While this will make the patient more comfortable, it does not reduce the development of arthritis, further joint damage, or resolve lameness.

Surgical Stabilization

The goal of surgery is NOT to repair the torn CCL. Surgery stabilizes the knee to eliminate abnormal movement. There are currently three surgical procedures that can be used for stabilization: Extra capsular stabilization, Tibial Plateau Leveling Osteotomy (TPLO), and Tibial Tuberosity Advancement (TTA).

Some disadvantages to surgical stabilization include:

1. Surgery does not cure the process that caused the CCL to rupture
2. There is still a risk of meniscal tear following surgery, requiring another procedure
3. All surgeries carry some risk for complications
4. Surgery is expensive for owners
5. Arthritis progression occurs after surgery

Investigators

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Platelet-rich Plasma (PRP) Study

Comparative Orthopaedic Research Laboratory

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**Bioenhanced repair of
cruciate rupture in dogs**

Comparative Orthopaedic Research Laboratory
SCHOOL OF VETERINARY MEDICINE

Bioenhanced Repair of Non-Contact Cruciate Rupture

Study Information

Background

Non-contact cruciate rupture (rupture or tear not associated with any known trauma) has a prevalence of 5-10% in many breeds. It is responsible for 20% of canine lameness and burdens U.S. pet owners with at least \$1 billion in healthcare costs each year. A majority of ruptures are degenerative, but the exact explanatory mechanism is not known, although a substantial genetic component is likely. Advancements in regenerative medicine treatment have enabled a clinical trial evaluating whether autologous (self) concentrated platelets collected from the same patient before surgery can stimulate cruciate ligament healing in dogs with non-contact cruciate rupture.

Platelet-rich Plasma (PRP)

The cranial cruciate ligament has a poor capacity to heal, because it is located within the knee joint and surrounded by joint fluid. Experimental defects in the cruciate ligament, analogous to stable partial tears seen clinically, can be induced to heal using treatment with autologous PRP. The regenerative capacity of platelets is attributed to at least 15 growth factors. Furthermore, intra-articular PRP reduces inflammatory changes within the knee joint.

Bioenhanced Cruciate Repair

During knee arthroscopy (scope) and tibial plateau leveling osteotomy (TPLO) treatment, autologous PRP treatment will be provided to the contralateral knee with early cruciate rupture. The PRP is prepared from a blood sample collected immediately before surgery.

Study Design

This clinical trial involves four hospital visits. Dogs scheduled for treatment with TPLO using a locking plate and with radiographic evidence of early disease in the contralateral (other) knee are eligible to participate. Magnetic resonance imaging (MRI) of the knees will be performed before surgery.

Follow-up is at 10 weeks for a TPLO recheck; 12 months for repeat MRI, and 24 months for repeat clinical examination. The risk of subsequent contralateral cruciate rupture in the treatment group will be compared with a large group of historic control dogs to determine whether or not the bioenhanced cruciate rupture treatment with autologous PRP is effective at blocking cruciate rupture.

Why is this research important?

Cruciate rupture is a common problem. Ultimately, bilateral rupture develops in a large majority of affected dogs. Confirmation that the PRP regenerative medicine treatment is effective would be a major advance. Currently, there is no effective medical treatment for stable partial cruciate rupture. Use of a minimally invasive bioenhanced disease-modifying therapy to block progressive cruciate tearing and arthritis progression may be an important alternative treatment to traditional surgical stabilization, which does not block arthritis progression.

Funding

This research is supported by the American Kennel Club Canine Health Foundation.

Can my dog participate in the study?"

Inclusion Criteria

The dogs enrolled in this study must be of a medium to large breed (> 35 lbs approximately) diagnosed with unilateral knee joint instability because of complete cruciate rupture. The other knee must be clinically stable with early phase cruciate rupture. Diagnosis of the other knee is based on clinical and radiographic evaluation.

If your dog qualifies for the study we will obtain the following:

- Force-plate analysis of gait
- Standing x-rays of both knees
- MRI images of the knees before surgery, under general anesthesia
- Biopsies of the joint lining during surgery to assess joint inflammation
- Collection of a blood sample and samples of knee joint fluid to assess joint inflammation and cruciate ligament damage

The study provides:

- Free MRI imaging of the knee to evaluate joint degeneration and healing response to treatment
- A bioenhanced cruciate rupture treatment that may help to reduce the risk of a second cruciate rupture developing in the other knee over time
- A small reduction in the cost of surgical treatment to be provided at the one-year recheck examination